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BALANCING INNOVATION AND ETHICS: EDUCATORS' PERSPECTIVES ON THE ROLE OF AI IN EDUCATION

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Abstract
Artificial intelligence (AI) is rapidly emerging as a transformative force across various sectors, including education. As AI continues to reshape the landscape of teaching and learning, it becomes essential to understand the perspectives of educators, who are at the forefront of this change. This study explores the attitudes and concerns of teachers regarding the integration of AI into educational practices. A total of 74 educators participated in the research, utilizing the Opinion Scale on Artificial Intelligence in Education to provide insights into their views. The findings reveal a generally positive outlook among teachers toward the adoption of AI in education, recognizing its potential to enhance the learning experience, streamline administrative tasks, and support personalized learning. However, the study also uncovers significant apprehensions, particularly concerning ethical issues, data privacy, and the potential loss of the human touch in teaching. These concerns underscore the complexities and challenges that come with integrating AI into educational environments. By examining both the benefits and the risks associated with AI in education, this study contributes to the broader discourse on the future of teaching and learning. It emphasizes the need for a balanced and thoughtful approach to AI implementation, one that not only maximizes the advantages of technological advancements but also ensures the protection of ethical standards and the rights of all stakeholders. As AI continues to evolve, this research highlights the importance of ongoing dialogue and collaboration among educators, policymakers, and technologists to navigate the challenges and opportunities presented by this powerful technology.

Keywords Innovations, artificial intelligence, ethics, education.

INTRODUCTION

In an age defined by rapid technological progress, education is undergoing a significant transformation, largely driven by the advent of Artificial Intelligence (AI) (Karaca & Kılcan, 2023). AI-based tools and technologies offer the potential to revolutionize the educational landscape by personalizing the learning experience, providing instant feedback, and automating routine tasks. This automation can enable teachers to dedicate more time to essential aspects of education, such as fostering relationships with students and delivering tailored instruction (Abell, 2006).

As Artificial Intelligence (AI) becomes increasingly embedded in classrooms and educational institutions globally, understanding educators' perspectives on this transformative technology is crucial. This research delves into teachers' nuanced views and attitudes toward AI's

integration into education, examining their perceptions, preferences, and concerns.

AI's potential to revolutionize education is significant (Fullan et al., 2023). With its ability to analyze large datasets, tailor instruction to individual student needs, and automate administrative tasks, AI promises to enhance educational outcomes and make learning more personalized and accessible. However, this promise is not without its challenges. Ethical dilemmas and privacy concerns pose critical questions about the responsible use of AI in educational settings. As AI continues to reshape the teaching and learning process, it becomes essential to understand educators' perspectives, given their vital role in shaping the future of education (Alam, 2021).

This study provides a comprehensive examination of teachers' perspectives by administering the Opinion Scale on Artificial Intelligence in Education. Through interviews with 74 educators, the research seeks to offer a well-rounded understanding of how teachers perceive AI's role in their classrooms and institutions. The findings highlight a dual response to AI in education—both enthusiasm for its potential and caution regarding the ethical and privacy issues it raises.

The research is organized to first explore the positive aspects that teachers associate with AI in education. It then addresses the ethical and privacy concerns that educators have voiced. Through this balanced analysis, the study contributes to the ongoing dialogue on AI's role in education and advocates for a holistic approach that leverages AI's benefits while protecting the core values and rights inherent in the educational process.

The findings of this study hold significant implications for policymakers, educators, and technology developers. It is crucial to design and implement AI-based educational tools and technologies with a keen understanding of teachers' perspectives and concerns. Involving teachers in the development and deployment of AI in education from the outset is essential to ensure these technologies meet the needs of both educators and students. Furthermore, providing teachers with adequate training and support is vital for the effective integration of AI in the classroom, enabling them to harness its full potential to enhance teaching and learning.

AI technologies consist of various computer systems and algorithms designed to replicate human intelligence, including capabilities like learning from data, reasoning, problem-solving, and interacting with the environment (Kok et al., 2009). As AI becomes more integrated into educational environments, understanding teachers' perspectives on this technological shift is increasingly important (Karakose et al., 2023).

The introduction of AI in classrooms is transforming teachers' roles and their attitudes toward technology. Numerous studies have explored educators' perceptions of AI and its impact on their profession (Athanassopoulos et al., 2023). Polak et al. (2022) used the Will, Skill, Tool model to examine how AI can be effectively integrated into education. Through focus groups and surveys, they identified the need for an AI-supportive online educational platform. The findings revealed that teachers generally have a positive attitude and strong motivation for AI in education (Will factor). Although they have basic digital skills, their proficiency in AI-specific skills was found to be limited (Skill factor). While resources were largely accessible, further research on the readiness of tools is advised.

Chounta et al. (2022) focused on how Estonian K-12 teachers perceive AI, using the Fairness, Accountability, Transparency, and Ethics (FATE) framework. A survey of 140 teachers showed that despite having limited AI knowledge, educators

view AI as a valuable educational tool. The study underscores the importance of AI support to enhance teacher productivity and highlights AI's role in helping teachers access and utilize multilingual content. Kim and Kim (2022) investigated STEM teachers' views on an AI-enhanced scaffolding system, finding that while most saw AI as beneficial for supporting scaffolding, there were concerns about changes in the teacher's role and the need for transparency in AI decision-making.

Although these studies have significantly contributed to understanding teachers' views on AI in education, there remain gaps that require further investigation (Papadakis et al., 2023). Many studies have yet to fully address the diversity of educational contexts and teacher demographics. Future research should consider variations in school types, grade levels, and work environments to provide a more complete understanding. This research aims to explore educators' perspectives on AI and determine if these views vary based on their years of teaching experience and subject specializations.

METHOD

This study utilized a survey research model to explore teachers' perspectives on the integration of AI in education. The survey approach was selected due to its structured and systematic method for gathering quantitative data from a diverse group of educators. The research model was meticulously crafted to meet specific objectives, including gauging teachers' attitudes toward AI, evaluating their preparedness for AI integration, and examining their perceptions of the benefits and challenges that AI presents in educational settings.

This study utilized the Opinion Scale on Artificial Intelligence in Education, developed by Dulger and Koklü (2003). The scale was specifically designed to assess the opinions of school administrators and teachers regarding the use of AI in education. Dulger and Koklü (2003) conducted a thorough examination of the questionnaire's psychometric properties. The study group consisted of school principals and teachers working in public high schools. During the scale's development, 62 initial items were created and reviewed by experts. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted to refine the scale. EFA resulted in a 28-item, four-dimensional scale, explaining 56.58% of the total variance. The dimensions identified were: the benefits of using AI in education, prejudices about AI in education, views on the scope of AI, and definitions of AI. CFA confirmed the scale's structure, with goodness-of-fit indices indicating a valid and reliable tool (χ^2 = 1017.416, df = 344, GFI = 0.862, RMSEA = 0.07, CFI = 0.91, NFI = 0.84). The scale is divided into two sections. The first section gathers demographic information, including the participants' gender, school type, educational background, field of study, and years of service. The second section, comprising 28 items, focuses on teachers' views on AI in education, using a 5-point Likert scale ranging from "1 Strongly Disagree" to "5 Strongly Agree" to measure their perspectives. Specifically, the scale includes 16 items related to the benefits of AI, six items addressing its drawbacks, two items concerning the scope of AI, and three items focused on defining the concept of AI.

This study employed purposive sampling as its method for participant selection. Researchers chose participants based on specific criteria to ensure the sample included a diverse range of educators with varying experiences and perspectives on integrating AI in education. This approach enabled the researchers to focus on individuals who could offer valuable insights aligned with the research objectives, such as understanding teachers' attitudes toward AI, evaluating their readiness for AI integration, and

exploring their perceptions of the benefits and challenges AI presents in educational contexts. Details about the participants' gender, type of school, years of service, and graduation rates are provided in Table 1.

Table 1: Distribution of participants

		Gender		Type of school		Years of service		Graduation Status		
		Male	Female	Public	Prive	4-20	21-37	Master's degree	Doctorate	Bachelor's degree
Teachers	f	20	54	62	12	37	37	16	5	53
	%	27	73	86.8	16.2	50	50	20.5	6.8	72.6

The sample included 27% male (n = 20) and 73% female (n = 54) participants. Among them, 16.2% (n = 12) were employed in private schools, while 83.8% (n = 62) worked in public schools. The lower number of male participants may reflect the higher proportion of women in the teaching profession. According to statistics from the Ministry of National Education (2021), there are 1,139,673 teachers in formal education, with 455,294 being male and 684,379 female. Additionally, there are fewer teachers in private schools compared to public schools, with 975,698 teachers in public institutions and 163,975 in private ones.

Regarding educational qualifications, 20.5% of participants hold a master's degree, 6.8% have a doctorate, and 72.6% possess a bachelor's degree. The lower number of participants with advanced degrees reflects the generally small proportion of teachers pursuing further education beyond their undergraduate studies.

Participants were categorized into two groups based on their years of experience: "new-generation" teachers with 4 to 20 years of experience, and "old-generation" teachers with 21 to 37 years. The distribution between these groups is relatively balanced. The participants come from 11 different fields, with detailed information provided in Table 2.

Table 2: Teachers' field of study

Teachers' field of study	f	%
English	25	33.8
Classroom Teacher	8	8.1
Science and Technology	8	10.8
Counsellor	7	10.8
Mathematics	6	9.5
Social Science	5	6.8
Technology and Design	4	5.4
Physical Education	3	4.1
Music	1	1.4

Special Education	1	1.4
Total	74	100

The data collection for this study was carried out using a Google Form questionnaire, which was distributed to teachers through WhatsApp. This method was chosen to efficiently gather quantitative data on educators' views regarding the integration of AI in education. Google Forms provided an organized platform for collecting responses from a diverse group of teachers, while WhatsApp enabled quick and direct distribution of the questionnaire link to the participants. Teachers received clear instructions and guidelines with the questionnaire to ensure consistency in their responses. They could access and complete the survey at their convenience, benefiting from the flexibility of an online platform like Google Forms, which allowed them to respond at a time and location that suited them. The data collection process was conducted with strict adherence to ethical standards, ensuring the confidentiality and anonymity of participants' responses. The research team was also available to address any questions or concerns that participants might have had during the survey period.

The data were initially analyzed using percentages (%), frequencies (f), standard deviation (S), and mean (x) to gain insights into the distribution and central tendency of the data. To assess the normality of the data, the Kolmogorov-Smirnov test was used, evaluating the data's distribution shape and its conformity to the normal distribution assumption. Additionally, Levene's test was conducted to check for homogeneity of variance across groups. Once the assumptions for parametric tests were confirmed, one-way ANOVA and independent sample t-tests were applied to examine whether teachers' views on artificial intelligence varied according to their years of employment and field of study. All statistical analyses and computations were carried out using the Statistical Package for the Social Sciences (SPSS) software, a widely utilized tool for statistical analysis and data management in the social sciences and psychology fields.

RESULT

Table 3 provides a summary of the perceived benefits of AI. The data reveal that a notable proportion of teachers have favorable views on AI in education. Specifically, 43% of teachers consider AI crucial for personalizing education, while 33% are uncertain about its effectiveness in this regard. Additionally, 65% of teachers believe AI will have a positive impact on the economy. Furthermore, 52% of teachers agree that AI will enhance productivity, though 30% remain unsure. A substantial 90% of teachers believe AI has the potential to save time.

In terms of AI's role in the educational process, 66% of teachers view AI as essential for monitoring learning progress, and 77% think it will aid in personalized learning. Moreover, 75% of teachers believe AI can effectively track students' learning and provide more effective educational materials. Additionally, 80% of teachers see AI as a valuable resource for offering varied methods to meet students' needs and as a complementary tool for educators. An overwhelming 90% of teachers view AI as a valuable asset for accessing information and time-saving, with many also seeing it as enhancing the enjoyment and accessibility of learning. Regarding AI's long-term impact, 58% of teachers think AI will promote more enduring learning, while 30% are undecided. Finally, 65% of teachers believe that AI will help achieve the goals of the education system.

Table 3: Findings about positive aspects of AI

Positive aspects (benefits) of Artificial Intelligence		1	2	3	4	5	Mean	SD
6. It is necessary for the individualization of education.	f	1	16	25	19	13	3.36	1.05
	%	1.4	21.6	33.8	25.7	17.6		
7. Contributes to the economy.	f	0	4	21	34	15	3.81	0.82
	%		5.4	28.4	45.9	20.3		
8. Increases productivity.	f	4	9	22	30	9	3.42	1.03
	%	5.4	12.2	29.7	40.5	12.2		
9. Saves time.	f	0	2	1	46	25	4.20	0.62
	%		2.7	1.4	62.2	33.8		
10. It is necessary to monitor the learning process.	f	2	7	15	34	16	3.75	0.99
	%	2.7	9.5	20.3	45.9	21.6		
11. Contributes to individual learning.	f	1	2	13	39	19	3.99	0.81
	%	1.4	2.7	17.6	52.7	25.7		
12. It follows students' learning process.	f	0	6	13	37	18	3.91	0.86
	%		8.1	17.6	50	24.3		
13. Provides more practical materials.	f	0	5	13	35	21	3.97	0.866
	%		6.8	17.6	47.3	28.4		
14. Offers different methods according to their needs.	f	0	0	13	41	20	4.09	0.66
	%			17.6	55.4	27		
15. It is a complementary resource for teachers.	f	0	3	5	46	20	4.12	0.7
	%		4.1	6.8	62.2	27		
16. It is a source for teachers to access information.	f	0	3	4	46	21	4.15	0.7
	%		4.1	5.4	62.2	28.4		
17. it is a source for teachers to access information.	f	0	2	6	45	21	4.15	0.68
	%		2.7	8.1	60.8	28.4		

18. it is a source for teachers to access information	f	1	8	22	29	14	3.67	0.95
	%	1.4	10.8	29.7	39.2	18.9		
19. It contributes to achieving the goals of the education system.	f	0	6	20	35	13	3.74	0.84
	%		8.1	27	47.3	17.6		
20. It makes learning more fun.	f	1	2	9	40	22	4.8	0.8
	%	1.4	2.7	12.2	54.1	29.7		
21. It makes learning easier.	f	3	1	10	44	16	3.93	0.88
	%	4.1	1.4	13.5	59.5	21.06		

These findings reveal the varied opinions teachers have about the potential benefits of AI in education, highlighting the importance of considering these perspectives in discussions and implementations of AI in educational settings. The survey results show that many teachers are optimistic about AI's positive impact on personalized learning, productivity, and the economy. They also believe AI can save time, monitor learning progress, and support the achievement of educational goals. These viewpoints emphasize AI's potential as a valuable supplementary resource for teachers, aiding in information access and making learning more enjoyable and efficient. However, it is important to address the concerns some teachers have regarding AI's use in education. Table 4 outlines these specific concerns. According to the survey, a significant majority (60%) of teachers worry that integrating AI into education might lead to a loss of emotional connection. Additionally, 47% express concerns about AI's potential security risks, with 33% remaining undecided on this issue. Furthermore, 47% of teachers are skeptical about AI's ability to ensure information confidentiality, while 36% are uncertain.

Regarding the impact on teaching and learning, 51% of teachers are concerned that AI could lead to passivity among students. Despite this, 60% do not believe AI will make teachers lazy, and 70% think AI will not reduce the researchers' role of teachers. However, 50% of teachers worry that AI integration might introduce ethical issues in the educational environment. These insights illustrate the diverse perspectives on AI's implications in education and underscore the need to consider these viewpoints in the ongoing debate about AI integration in educational settings. AI encompasses various applications, including its role as an auxiliary system for education and a tool for knowledge management. Teachers' opinions on the scope of AI are detailed in Table 5.

Table 5: Findings on the scope of AI

Scope of Artificial Intelligence		1	2	3	4	5	Mean	SD
3. It is an auxiliary system for education.	f	0	1	14	39	20	4.05	0.71

	%		1.4	18.9	52.7	27		
It is a tool that can be used in knowledge 4. management	f	0	0	5	44	25	4.27	0.58
	%			6.8	59.5	33.8		

The survey results indicate that the majority of teachers (58%) view AI as a valuable system that supports and enhances the educational process. Furthermore, a substantial 90% of teachers consider AI to be a crucial tool for knowledge management. Detailed findings on teachers' perceptions of AI are presented in Table 6.

Table 6 Findings on the concept of AI

The Concept of Artificial Intelligence		1	2	3	4	5	Mean	SD
It is a computer-controlled robot designed to 5. perform tasks.	f	3	4	6	39	22	3.99	0.98
	%	4.1	5.4	8.1	52.7	29.7		
1. It is high-level technology.	f	0	2	4	34	34	4.35	0.71
	%		2.7	5.4	45.9	45.9		
2. It is a computer program.	f	1	3	3	42	25	4.18	0.80
	%	1.4	4.1	4.1	56.8	33.8		

Teachers describe AI as an advanced technology encompassing computer programs and computer-controlled robots designed to perform various tasks. To assess whether teachers' perspectives on AI differed based on their length of service, an independent sample t-test was conducted. Teachers were categorized into two groups based on their years of service: those with 4 to 20 years of experience were classified as the "new generation," while those with 21 to 37 years were classified as the "old generation." Descriptive statistics for these groups are provided in the participants' section.

Teachers' views on AI were measured using a Likert-type scale, with scores ranging from 1 to 5. These scores were aggregated and analyzed using the independent sample t-test. Descriptive statistics for the overall scores reflecting teachers' views on AI are detailed in Table 7.

Table 7: Descriptive findings of the total score of teachers' views on AI

	Min	Max	Mean	SD	Kolmogrov Smirnov
Total points	84	138	106	9.5	0.198

The total scores on the scale ranged from a minimum of 84 to a maximum of 138. The mean score was 106, with a standard deviation of 9.5. The Kolmogorov-Smirnov test was used to assess the normality of the distribution of these total scores. Examination of Table 7 shows that the distribution of teachers' opinions on AI is approximately normal. With the assumptions for parametric testing met, an independent sample t-test was employed to evaluate whether teachers' views on AI varied according to their years of experience. The results of the independent sample t-test are presented in Table 8.

Table 8: Findings about independent sample t-test

	Years of service	N	Mean	SD	t	df	p
Total points	1 (21-37)	37	106	10	0.375	72	0.709
	2 (4-20)	37	105	8			

Analysis of Table 8 reveals that teachers' views on artificial intelligence do not vary according to their years of service. To examine whether teachers' opinions on AI differ across various branches, a one-way ANOVA was conducted. This test was chosen due to the involvement of teachers from 11 different branches. Prior to performing the one-way ANOVA, it was crucial to verify that the test assumptions were met, including the homogeneity of variances among groups and the normality of the data (Kim & Cribbie, 2017). The normality assessment is detailed in Table 7. Levene's test, which was conducted to assess variance homogeneity, is presented in Table 9.

Table 9 Levene's test

Levene Statics	df1	df2	Sig
2.48	8	63	0.783

Examination of Table 9 shows that the Levene test result for the items is not significant ($p > 0.05$). This indicates that the data set meets the assumptions required for the ANOVA test. The findings, as presented in Table 10, reveal that teachers' opinions about artificial intelligence do not differ based on their field of study.

Table 10 Findings on One way ANOVA

Total points	Sum of Squares	df	Mean Square	F	Sig.
Between groups	1356.645	10	135.664	1.609	0.125
Within groups	5311.207	63	84.305		

Total	6667.851	73

DISCUSSION

The study on teachers' perceptions of AI in education provides insightful perspectives on how AI is viewed as a supplementary tool in educational settings. The data reveals that many teachers hold positive views of AI, considering it a valuable asset for enhancing education. They see AI as beneficial for supporting individualized learning, contributing to the economy, improving productivity, and tracking the learning process. Additionally, teachers recognize AI's potential to offer complementary resources, aid in material development, enhance learning outcomes, and help achieve educational goals. Despite these positive views, some teachers have raised concerns about AI's role, including fears of diminishing emotional engagement, threats to security and privacy, and the risk of fostering passivity among students. There are also concerns about how AI might impact teachers' roles and ethical considerations.

The positive perception of AI among teachers aligns with the broader recognition of technology's benefits in education. This sentiment is consistent with research highlighting the growing awareness of technology's impact on educational outcomes, such as digital addiction and academic achievement (Karakose et al., 2023). The study's findings support previous research showing a generally favorable attitude towards AI as an educational tool, consistent across different levels of experience and academic backgrounds (Chiu & Chai, 2020).

The study also reflects a well-rounded understanding of AI, including its applications in robotics, advanced technology, and programming, as noted in research by Hinojo-Lucena et al. (2019) and Akgun¨ and Greenhow (2021). These findings underscore a comprehensive awareness of AI's potential to revolutionize education, despite concerns about privacy and over-reliance. Teachers largely view AI as a beneficial educational tool, acknowledging its potential to enhance personalized learning and manage knowledge efficiently. While there are valid concerns, the overall perception is positive, indicating a broad understanding and acceptance of AI's role in education.

REFERENCES

1. Abell, M. (2006). Individualizing learning using intelligent technology and universally designed curricu-lum. The journal of technology, learning and assessment, 5(3).
2. Akgun, S., & Greenhow, C. (2022). Artificial Intelligence (AI) in Education: Addressing Societal and Ethical Challenges in K-12 Settings. In Proceedings of the 16th International Conference of the Learning Sciences-ICLS 2022, pp. 1373-1376. International Society of the Learning Sciences.
3. Alam, A. (2021). Possibilities and apprehensions in the landscape of artificial intelligence in education. In 2021 International Conference on Computational Intelligence and Computing Applications (ICCICA) (pp. 1-8). IEEE.
4. Alam, A. (2021). Possibilities and Apprehensions in the Landscape of Artificial Intelligence in Education. 2021 International Conference on Computational Intelligence and Computing Applications (ICCICA). https://doi.org/10.1109/iccica52458.2021.9697272
5. Athanassopoulos, S., Manoli, P., Gouvi, M., Lavidas, K., & Komis, V. (2023). The use of

ChatGPT as a learning tool to improve foreign language writing in a multilingual and multicultural classroom. Advances in Mobile Learning Educational Research, 3(2), 818–824. https://doi.org/10.25082/amler.2023.02.009

6. Chiu, T. K. F., & Chai, C. (2020). Sustainable Curriculum Planning for Artificial Intelligence Education: A Self-Determination Theory Perspective. Sustainability, 12(14), 5568. https://doi.org/10.3390/su12145568
7. Chiu, T. K. F., Meng, H., Chai, C.-S., King, I., Wong, S., & Yam, Y. (2022). Creation and Evaluation of a Pretertiary Artificial Intelligence (AI) Curriculum. IEEE Transactions on Education, 65(1), 30–39. https://doi.org/10.1109/te.2021.3085878
8. Chounta, I. A., Bardone, E., Raudsep, A., & Pedaste, M. (2021). Exploring Teachers' Perceptions of Artificial Intelligence as a Tool to Support their Practice in Estonian K-12 Education. International Journal of Artificial Intelligence in Education, 32(3), 725–755. https://doi.org/10.1007/s40593-021-00243-5
9. Fullan, M., Azor´ın, C., Harris, A., & Jones, M. (2023). Artificial intelligence and school leadership: challenges, opportunities and implications. School Leadership & Management, 1-8.
10. Fullan, M., Azor´ın, C., Harris, A., & Jones, M. (2023). Artificial intelligence and school leadership: challenges, opportunities and implications. School Leadership & Management, 1–8. https://doi.org/10.1080/13632434.2023.2246856
11. Hinojo-Lucena, F.-J., Aznar-D´ıaz, I., Caceres´-Reche, M.-P., & Romero-Rodr´ıguez, J.-M. (2019). Artifi-cial Intelligence in Higher Education: A Bibliometric Study on its Impact in the Scientific Literature. Education Sciences, 9(1), 51. https://doi.org/10.3390/educsci9010051
12. John-Mathews, J.-M. (2022). Some critical and ethical perspectives on the empirical turn of AI inter-pretability. Technological Forecasting and Social Change, 174, 121209. https://doi.org/10.1016/j.techfore.2021.121209
13. Karaca, A., & Kilcan, B. (2023). The Adventure of Artificial Intelligence Technology in Education: Comprehensive Scientific Mapping Analysis. Participatory Educational Research, 10(4), 144–165. https://doi.org/10.17275/per.23.64.10.4
14. Karakose, T., Demirkol, M., Aslan, N., Kose,¨ H., & Yirci, R. (2023). A Conversation with ChatGPT about the Impact of the COVID-19 Pandemic on Education: Comparative Review Based on Human–AI Collaboration. Educational Process International Journal, 12(3). https://doi.org/10.22521/edupij.2023.123.1
15. Karakose, T., Tul¨ubas¨¸, T., Papadakis, S., & Yirci, R. (2023). Evaluating the Intellectual Structure of the Knowledge Base on Transformational School Leadership: A Bibliometric and Science Mapping Analysis. Education Sciences, 13(7), 708. https://doi.org/10.3390/educsci13070708
16. Kim, N. J., & Kim, M. K. (2022). Teacher's Perceptions of Using an Artificial Intelligence-Based Educational Tool for Scientific Writing. Frontiers in Education, 7. https://doi.org/10.3389/feduc.2022.755914
17. Kim, Y. J., & Cribbie, R. A. (2017). ANOVA and the variance homogeneity assumption: Exploring a better gatekeeper. British Journal of Mathematical and Statistical Psychology, 71(1), 1–12. Portico.

https://doi.org/10.1111/bmsp.12103

18. Ministry of National Education. (2021). Turkiye¨ Milli Egitim˘ Bakanlıg˘ı Istatistikleri. https://www.meb.gov.tr

19. Papadakis, S. J., Semerikov, S. O., Yechkalo, Y. V., Velychko, V. Y., Vakaliuk, T. A., Amelina, S. M., ...& Tkachuk, V. V. (2023). Advancing lifelong learning and professional development through ICT: insights from the 3L-Person 2023 workshop. In Proceedings of the 3L-Person 2023 workshop, Kryvyi Rih, Ukraine, October 25, 2023.

20. Papadakis, S. J., Semerikov, S. O., Yechkalo, Y. V., Velychko, V. Y., Vakaliuk, T. A., Amelina, S. M., ... & Tkachuk, V. V. (2023). Advancing lifelong learning and professional development through ICT: insights from the 3L-Person 2023 workshop. https://doi.org/10.31812/123456789/8483

21. Polak, S., Schiavo, G., & Zancanaro, M. (2022). Teachers' Perspective on Artificial Intelligence Educa-tion: an Initial Investigation. CHI Conference on Human Factors in Computing Systems Extended Abstracts. https://doi.org/10.1145/3491101.3519866

22. Zhao, L., Wu, X., & Luo, H. (2022). Developing AI Literacy for Primary and Middle School Teachers in China: Based on a Structural Equation Modeling Analysis. Sustainability, 14(21), 14549. https://doi.org/10.3390/su142114549